

CLAIMS:

1. A material handling system for a product to be manually processed by an operator at a work-station, including:

batch delivery means for automatically delivering batches of the product to the work-station on an “as required” or “on demand” basis for manual processing by the operator; and

packing container delivery means for automatically delivering individual packing containers to the work-station on an “as required” or “on demand” basis for filling with the product after manual processing by the operator.

2. A material handling system according to claim 1, wherein the batch delivery means includes means for sensing or identifying when a batch of product is required at the work-station.

3. A material handling system according to claim 2, wherein each batch of product is provided in a batch container, and the batch delivery means includes a shuttle device for transporting one of the batch containers from a product supply station to the work-station when the work-station is identified as requiring the product batch.

4. A material handling system according to claim 3, wherein the batch delivery means includes a mechanism for transferring the batch container from the shuttle device to an access position for the operator at the work-station.

5. A material handling system according to claim 4, wherein the batch delivery means includes a batch container buffer for accommodating a batch container of product adjacent the work-station.

6. A material handling system according to claim 1, wherein the packing container delivery means includes means for sensing or identifying when a packing container is

required at the work-station, and means for conveying individual packing containers to the work-station when the work-station is identified as requiring one or more of the packing containers.

7. A material handling system according to claim 6, wherein the packing container delivery means includes guide means for directing delivery of the packing containers to a filling position at each of the operator work-stations.

8. A material handling system according to claim 7, wherein the guide means is in the form of a chute that extends from a packing container conveyor to the work-station.

9. A material handling system according to claim 8, wherein the packing container delivery means includes a packing container buffer for accommodating a plurality of packing containers adjacent the work-station.

10. A material handling system according to claim 9, wherein the packing container buffer is provided in the guide chute.

11. A material handling system according to claim 1, wherein the work-station is designed to ergonomically accommodate a human operator and includes a work space in which the product may be manually processed by the operator, the batch delivery means being adapted to deliver the batches of the product to an access position at the work-station within easy reach of the operator, and the packing container delivery means being adapted to deliver the individual packing containers to a filling position at the work-station within easy reach of the operator.

12. A material handling system according to claim 11, wherein the work space takes the form of bench space immediately in front of the operator, and wherein the access position to which the batch containers of product are delivered is adjacent to and in front of the work space within easy reach of the operator, and the filling position to which the

packing containers are delivered is adjacent and to one side of the work space where the operator can fill it with the product after that product has been manually processed.

13. A material handling system according to claim 1, further including packing container dispatch means for automatically dispatching product-filled packing containers from the work-station on an "as required" or "on demand" basis.

14. A material handling system according to claim 13, wherein the packing container dispatch means includes a mechanism to remove the product-filled packing container from the filling position at the work-station, and an actuator device for use by the operator to actuate the removal mechanism when that filled packing container is ready for dispatch.

15. A material handling system according to claim 14, wherein the removal mechanism of the packing container dispatch means is adapted to discharge the product-filled packing container to a conveyor for carrying that container to a final packaging station.

16. A material handling system according to claim 1, further including batch container dispatch means for automatically dispatching the batch containers from each work-station on an "as required" or "on demand" basis.

17. A material handling system according to claim 16, wherein the batch container dispatch means includes a mechanism to remove the batch container from the access position at the work-station, and an actuator device for use by the operator to actuate the removal mechanism when that batch container is ready for dispatch.

18. A material handling system according to claim 17, wherein the mechanism to remove the emptied batch container from the access position is adapted to transfer that container to a conveyor, which is able to carry it to a batch container return station.

19. A material handling system according to claim 1, further including a computer controller for controlling the various automatic operations of the system.
20. A material handling system according to claim 1, wherein the work-station is any one of a plurality of separate work-stations belonging to the material handling system.
21. A material handling system according to claim 1, wherein the material handling system is in the form of a processing line having a plurality of separate operator work-stations, said processing line having most of the system conveying and transporting operations occurring along a substantially common, primary line of direction.
22. A material handling system according to claim 21, wherein the operator work-stations are spaced apart along the processing line with the work-stations located on both sides of that line.
23. A material handling method for a product to be processed manually by an operator at a work-station, the method including the steps of:
- automatically delivering discrete batches of the product to the work-station on an “as required” or “on demand” basis for manual processing by the operator; and
  - automatically delivering individual packing containers to the work-station on an “as required” or “on demand” basis for filling with the product processed by the operator.
24. A material handling method according to claim 23, further including the step of: automatically dispatching each product-filled packing container from the work-station on an “as required” or “on demand” basis.

25. A material handling method according to claim 23, wherein each batch of product is supplied in a batch container and the method further includes the step of: automatically dispatching the batch container from the work-station on an "as required" or "on demand" basis.

26. A material handling system for a product to be manually processed by an operator at a work-station, including:

packing container delivery means for automatically delivering individual packing containers to the work-station on an "as required" or "on demand" basis for filling with the product after manual processing by the operator;

packing container dispatch means for automatically dispatching product-filled packing containers from the work-station on an "as required" or "on demand" basis.

27. A material handling system according to claim 26, further including batch delivery means for automatically delivering batch containers of the product to the work-station on an "as required" or "on demand" basis for manual processing by the operator.

28. A material handling system according to claim 27, further including batch container dispatch means for automatically dispatching the batch containers from the work-station on an "as required" or "on demand" basis.

29. A material handling method for a product to be manually processed by an operator at a work-station, the method including the steps of:

automatically delivering individual packing containers to the work-station for filling with the product after manual processing by the operator on an "as required" or "on demand" basis; and

automatically dispatching each product-filled packing container from the work-station on an "as required" or "on demand" basis.

30. A material handling method according to claim 29, further including the step of: automatically delivering discrete batch containers of the product to the work-station for manual processing by the operator on an “as required” or “on demand” basis.

31. A material handling method according to claim 30, further including the step of: automatically dispatching the batch containers from the work-station on an “as required” or “on demand” basis.

32. A material handling system for a product to be manually processed by an operator at a work-station, including:

batch delivery means for automatically delivering batch containers of the product to the work-station on an “as required” or “on demand” basis for manual processing by the operator; and

batch container dispatch means for automatically dispatching the batch containers from the work-station on an “as required” or “on demand” basis.

33. A material handling method for a product to be manually processed by an operator at a work-station, the method including the steps of:

automatically delivering discrete batch containers of the product to the work-station on an “as required” or “on demand” basis for manual processing by the operator; and

automatically dispatching the batch containers from the work-station on an “as required” or “on demand” basis.